AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A method for detecting the direction of an incoming round, comprising the steps of:

deploying an electric field sensor array having individual electric field sensors that sense the local static electric field about the sensor;

using electric field sensors to sense a change in the local static electric field at the sensor caused by the incoming round;

determining the time difference of arrival of the round by sensing maximum change in the static electric field adjacent each of said electric field sensors in the array; and,

computing angle of arrival from the time differences.

2. (Previously Amended) The method of Claim 1, wherein the time-difference-of-arrival determining step includes detecting the zero crossover of the signals from each of the sensors to detect the time of closest approach of the round to the sensor.

3. (Previously Amended) The method of Claim 2, wherein the zero crossover is determined by a first partial derivative of dE/dT for each electric field sensor.

4. (Previously Amended) The method of Claim 1, wherein the electric field sensors are located on the corners of a rectilinear shape.

5. (Original) The method of Claim 4, wherein the rectilinear shape is a square.

6. (Previously Amended) The method of Claim 4, wherein the step of computing angle of arrival includes using an arc-tan-2 function, with selected electric field sensor pair time differences of arrival used as the arguments for the arc-tan-2 function.

7. (Previously Amended) The method of Claim 1, and further including the step of filtering the outputs of the electric field sensors to remove electric field disturbances due to the local power line fields.

8. (Previously Amended) The method of Claim 7, wherein the filtering step includes providing a plurality of bins for accumulating the output of the associated electric field sensor, with the bins dividing up the AC power line cycle and providing an average value for each bin over a number of cycles, with a predetermined variation in a bin from the average value being declared an event not due to power line-induced electric field changes.

9. (Previously Amended) The method of Claim 8, and further including the step of storing all of the electric field outputs after a declared event.

10. (Original) The method of Claim 9, wherein the angle of arrival is computed from the stored outputs associated with a declared event.

11. (Previously Amended) The method of Claim 10, wherein the time difference of arrival between pairs of electric field sensors is computed from the stored outputs.

12. (Previously Amended) The method of Claim 1, wherein separate angle of arrival computations are made for different pairs of electric field sensors.

13. (Original) The method of Claim 12 and further including determining the standard deviation for each computed angle of arrival and for declaring the passage of a round, when the computed angle of arrival is less than the standard deviation.

14. (Original) The method of Claim 13, wherein the computed angles of arrival for each pair are averaged prior to comparison with the standard deviation.

15. (Previously Amended) The method of Claim 1, wherein the direction of an incoming round is used for applications selected from the group consisting of man-carried electric field sensors, land vehicle-carried electric field sensors and aircraft-carried electric field sensors.

16. (Currently Amended) Apparatus for detecting the direction of an incoming round, comprising:

an array of individual sensors, each having an output that detects the local static electric field threat; and,

a processor coupled to each electric field sensor to determine by the change in the local static electric field at said sensors caused by the proximity of a round the time of closest approach of said round to the associated sensor and to determine angle of arrival from the time difference of arrival of the round at selected pairs of electric field sensors.

17. (Original) The apparatus of Claim 16, wherein said array is a rectilinear array.

18. (Original) The apparatus of Claim 17, wherein said array is a square array.

19. (Original) The apparatus of Claim 16, wherein different pairs of sensors are used to compute angle of arrival, each resulting in an angle of arrival in different separate channels, and wherein said processor averages the results in each channel and compares the averaged results to an associated standard deviation, such that when the averaged results are within a predetermined standard deviation the presence of a round is declared as well as the direction of the trajectory of said round.

20. (Original) The apparatus of Claim 16, and further including a display of the direction of said incoming round.